

[illegible]

<120> MODIFIED INOSINE 5'-MONOPHOSPHATE DEHYDROGENASE  
POLYPEPTIDES AND USES THEREOF

<140> Not yet known  
<141> 2001-05-10

<160> 65

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<210> 1
<211> 3
<212> PRT
<213> Homo sapiens
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<211> 3
<212> PRT
<213> Homo sapiens
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<212> PRT  
<213> Homo sapiens

<400> 3  
Ser Pro Ser  
1

<210> 4  
<211> 3  
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<213> Homo sapiens

<400> 4  
Ser Ala His  
1

<210> 5  
<211> 3  
<212> PRT  
<213> Homo sapiens

<400> 5  
Lys Pro Ile  
1

<210> 6  
<211> 3  
<212> PRT  
<213> Homo sapiens

<400> 6  
Ile Val Asp  
1

<210> 7  
<211> 3  
<212> PRT  
<213> Homo sapiens

<400> 7  
Ala Leu Phe  
1

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<210> 13  
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<213> Homo sapiens

<400> 13  
Asn Ile Ile Pro  
1

<210> 14  
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<400> 14  
Ser Pro Thr Gln  
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<210> 15  
<211> 4  
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<213> Homo sapiens

<400> 15  
Thr Arg Tyr Thr  
1

<210> 16  
<211> 4  
<212> PRT  
<213> Homo sapiens

<400> 16  
Ala Gly Arg Pro  
1

<210> 17  
<211> 4  
<212> PRT  
<213> Homo sapiens

<400> 17



Pro Glu Phe Gln Ala Asn Glu Val Arg Lys Val Lys Lys Tyr Asp Lys  
 100 105 110

Thr Leu Leu Cys Gly Ala Ala Ile Gly Thr His Glu Asp Asp Lys Tyr  
 115 120 125

Arg Leu Asp Leu Leu Ala Gln Ala Gly Val Asp Val Val Val Leu Asp  
 130 135 140

Ser Ser Gln Gly Asn Ser Ile Phe Gln Ile Asn Met Ile Lys Tyr Ile  
 145 150 155 160

Lys Asp Lys Tyr Pro Asn Leu Gln Val Ile Gly Gly Asn Val Val Thr  
 165 170 175

Ala Ala Gln Ala Lys Asn Leu Ile Asp Ala Gly Val Asp Ala Leu Arg  
 180 185 190

Val Gly Met Gly Ser Gly Ser Ile Cys Ile Thr Gln Glu Val Leu Ala  
 195 200 205

Cys Gly Arg Pro Gln Ala Thr Ala Val Tyr Lys Val Ser Glu Tyr Ala  
 210 215 220

Arg Arg Phe Gly Val Pro Val Ile Ala Asp Gly Gly Ile Gln Asn Val  
 225 230 235 240

Gly His Ile Ala Lys Ala Leu Ala Leu Gly Ala Ser Thr Val Met Met  
 245 250 255

Gly Ser Leu Leu Ala Ala Thr Thr Glu Ala Pro Gly Glu Tyr Phe Phe  
 260 265 270

Ser Asp Gly Ile Arg Leu Lys Lys Tyr Arg Gly Met Gly Ser Leu Asp  
 275 280 285

Ala Met Asp Lys His Leu Ser Ser Gln Asn Arg Tyr Phe Ser Glu Ala  
 290 295 300

Asp Lys Ile Lys Val Ala Gln Gly Val Ser Gly Ala Val Gln Asp Lys  
 305 310 315 320

Gly Ser Ile His Lys Phe Val Pro Tyr Leu Ile Ala Gly Ile Gln His  
 325 330 335

Ser Cys Gln Asp Ile Gly Ala Lys Ser Leu Thr Gln Val Arg Ala Met  
 340 345 350

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Ala Ala Gln Ala Lys Asn Leu Ile Asp Ala Gly Val Asp Ala Leu Arg  
 180 185 190  
 Val Gly Met Gly Ser Gly Ser Ile Cys Ile Thr Gln Glu Val Leu Ala  
 195 200 205  
 Cys Gly Arg Pro Gln Ala Thr Ala Val Tyr Lys Val Ser Glu Tyr Ala  
 210 215 220  
 Arg Arg Phe Gly Val Pro Val Ile Ala Asp Gly Gly Ile Gln Asn Val  
 225 230 235 240  
 Gly His Ile Ala Lys Ala Leu Ala Leu Gly Ala Ser Thr Val Met Met  
 245 250 255  
 Gly Ser Leu Leu Ala Ala Thr Thr Glu Ala Pro Gly Glu Tyr Phe Phe  
 260 265 270  
 Ser Asp Gly Ile Arg Leu Lys Lys Tyr Arg Gly Met Gly Ser Leu Asp  
 275 280 285  
 Ala Met Asp Lys His Leu Ser Ser Gln Asn Arg Tyr Phe Ser Glu Ala  
 290 295 300  
 Asp Lys Ile Lys Val Ala Gln Gly Val Ser Gly Ala Val Gln Asp Lys  
 305 310 315 320  
 Gly Ser Ile His Lys Phe Val Pro Tyr Leu Ile Ala Gly Ile Gln His  
 325 330 335  
 Ser Cys Gln Asp Ile Gly Ala Lys Ser Leu Thr Gln Val Arg Ala Met  
 340 345 350  
 Met Tyr Ser Gly Glu Leu Lys Phe Glu Lys Arg Thr Ser Ser Ala Gln  
 355 360 365  
 Val Glu Gly Gly Val His Ser Leu His Ser Tyr Glu Lys Arg Leu Phe  
 370 375 380

<210> 22  
 <211> 384  
 <212> PRT  
 <213> Homo sapiens



<400> 22

Met Ala Asp Tyr Leu Ile Ser Gly Gly Thr Ser Tyr Val Pro Asp Asp  
1 5 10 15

Gly Leu Thr Ala Gln Gln Leu Phe Asn Cys Gly Asp Gly Leu Thr Tyr  
20 25 30

Asn Asp Phe Leu Ile Leu Pro Gly Tyr Ile Asp Phe Thr Ala Asp Gln  
35 40 45

Val Asp Leu Thr Ser Ala Leu Thr Lys Lys Ile Thr Leu Lys Thr Pro  
50 55 60

Leu Val Ser Ser Pro Met Asp Thr Val Thr Glu Ala Gly Met Ala Ile  
65 70 75 80

Ala Met Ala Leu Thr Gly Gly Ile Gly Phe Ile His His Asn Cys Thr  
85 90 95

Pro Glu Phe Gln Ala Asn Glu Val Arg Lys Val Lys Lys Tyr Ser Pro  
100 105 110

Ser Leu Leu Cys Gly Ala Ala Ile Gly Thr His Glu Asp Asp Lys Tyr  
115 120 125

Arg Leu Asp Leu Leu Ala Gln Ala Gly Val Asp Val Val Val Leu Asp  
130 135 140

Ser Ser Gln Gly Asn Ser Ile Phe Gln Ile Asn Met Ile Lys Tyr Ile  
145 150 155 160

Lys Asp Lys Tyr Pro Asn Leu Gln Val Ile Gly Gly Asn Val Val Thr  
165 170 175

Ala Ala Gln Ala Lys Asn Leu Ile Asp Ala Gly Val Asp Ala Leu Arg  
180 185 190

Val Gly Met Gly Ser Gly Ser Ile Cys Ile Thr Gln Glu Val Leu Ala  
195 200 205

Cys Gly Arg Pro Gln Ala Thr Ala Val Tyr Lys Val Ser Glu Tyr Ala  
210 215 220

Arg Arg Phe Gly Val Pro Val Ile Ala Asp Gly Gly Ile Gln Asn Val  
225 230 235 240

Gly His Ile Ala Lys Ala Leu Ala Leu Gly Ala Ser Thr Val Met Met

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Met Ala Asp Tyr Leu Ile Ser Gly Gly Thr Ser Tyr Val Pro Asp Asp  
1 5 10 15

Gly Leu Thr Ala Gln Gln Leu Phe Asn Cys Gly Asp Gly Leu Thr Tyr  
20 25 30

Asn Asp Phe Leu Ile Leu Pro Gly Tyr Ile Asp Phe Thr Ala Asp Gln  
35 40 45

Val Asp Leu Thr Ser Ala Leu Thr Lys Lys Ile Thr Leu Lys Thr Pro  
50 55 60

Leu Val Ser Ser Pro Met Asp Thr Val Thr Glu Ala Gly Met Ala Ile  
65 70 75 80

Ala Met Ala Leu Thr Gly Gly Ile Gly Phe Ile His His Asn Cys Thr  
85 90 95

Pro Glu Phe Gln Ala Asn Glu Val Arg Lys Val Lys Lys Tyr Ile Val  
100 105 110

Asp Leu Leu Cys Gly Ala Ala Ile Gly Thr His Glu Asp Asp Lys Tyr  
115 120 125

Arg Leu Asp Leu Leu Ala Gln Ala Gly Val Asp Val Val Val Leu Asp  
130 135 140

Ser Ser Gln Gly Asn Ser Ile Phe Gln Ile Asn Met Ile Lys Tyr Ile  
145 150 155 160

Lys Asp Lys Tyr Pro Asn Leu Gln Val Ile Gly Gly Asn Val Val Thr  
165 170 175

Ala Ala Gln Ala Lys Asn Leu Ile Asp Ala Gly Val Asp Ala Leu Arg  
180 185 190

Val Gly Met Gly Ser Gly Ser Ile Cys Ile Thr Gln Glu Val Leu Ala  
195 200 205

Cys Gly Arg Pro Gln Ala Thr Ala Val Tyr Lys Val Ser Glu Tyr Ala

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210	215	220
Arg Arg Phe Gly Val Pro Val Ile Ala Asp Gly Gly Ile Gln Asn Val		
225	230	235 240
Gly His Ile Ala Lys Ala Leu Ala Leu Gly Ala Ser Thr Val Met Met		
	245	250 255
Gly Ser Leu Leu Ala Ala Thr Thr Glu Ala Pro Gly Glu Tyr Phe Phe		
	260	265 270
Ser Asp Gly Ile Arg Leu Lys Lys Tyr Arg Gly Met Gly Ser Leu Asp		
	275	280 285
Ala Met Asp Lys His Leu Ser Ser Gln Asn Arg Tyr Phe Ser Glu Ala		
	290	295 300
Asp Lys Ile Lys Val Ala Gln Gly Val Ser Gly Ala Val Gln Asp Lys		
305	310	315 320
Gly Ser Ile His Lys Phe Val Pro Tyr Leu Ile Ala Gly Ile Gln His		
	325	330 335
Ser Cys Gln Asp Ile Gly Ala Lys Ser Leu Thr Gln Val Arg Ala Met		
	340	345 350
Met Tyr Ser Gly Glu Leu Lys Phe Glu Lys Arg Thr Ser Ser Ala Gln		
	355	360 365
Val Glu Gly Gly Val His Ser Leu His Ser Tyr Glu Lys Arg Leu Phe		
	370	375 380

<210> 26  
<211> 384  
<212> PRT  
<213> Homo sapiens

<400> 26  
Met Ala Asp Tyr Leu Ile Ser Gly Gly Thr Ser Tyr Val Pro Asp Asp  
1 5 10 15  
Gly Leu Thr Ala Gln Gln Leu Phe Asn Cys Gly Asp Gly Leu Thr Tyr  
20 25 30

Asn Asp Phe Leu Ile Leu Pro Gly Tyr Ile Asp Phe Thr Ala Asp Gln  
 35 40 45  
 Val Asp Leu Thr Ser Ala Leu Thr Lys Lys Ile Thr Leu Lys Thr Pro  
 50 55 60  
 Leu Val Ser Ser Pro Met Asp Thr Val Thr Glu Ala Gly Met Ala Ile  
 65 70 75 80  
 Ala Met Ala Leu Thr Gly Gly Ile Gly Phe Ile His His Asn Cys Thr  
 85 90 95  
 Pro Glu Phe Gln Ala Asn Glu Val Arg Lys Val Lys Lys Tyr Ala Leu  
 100 105 110  
 Phe Leu Leu Cys Gly Ala Ala Ile Gly Thr His Glu Asp Asp Lys Tyr  
 115 120 125  
 Arg Leu Asp Leu Leu Ala Gln Ala Gly Val Asp Val Val Val Leu Asp  
 130 135 140  
 Ser Ser Gln Gly Asn Ser Ile Phe Gln Ile Asn Met Ile Lys Tyr Ile  
 145 150 155 160  
 Lys Asp Lys Tyr Pro Asn Leu Gln Val Ile Gly Gly Asn Val Val Thr  
 165 170 175  
 Ala Ala Gln Ala Lys Asn Leu Ile Asp Ala Gly Val Asp Ala Leu Arg  
 180 185 190  
 Val Gly Met Gly Ser Gly Ser Ile Cys Ile Thr Gln Glu Val Leu Ala  
 195 200 205  
 Cys Gly Arg Pro Gln Ala Thr Ala Val Tyr Lys Val Ser Glu Tyr Ala  
 210 215 220  
 Arg Arg Phe Gly Val Pro Val Ile Ala Asp Gly Gly Ile Gln Asn Val  
 225 230 235 240  
 Gly His Ile Ala Lys Ala Leu Ala Leu Gly Ala Ser Thr Val Met Met  
 245 250 255  
 Gly Ser Leu Leu Ala Ala Thr Thr Glu Ala Pro Gly Glu Tyr Phe Phe  
 260 265 270  
 Ser Asp Gly Ile Arg Leu Lys Lys Tyr Arg Gly Met Gly Ser Leu Asp  
 275 280 285









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180										185					190				
Val	Gly	Met	Gly	Ser	Gly	Ser	Ile	Cys	Ile	Thr	Gln	Glu	Val	Leu	Ala				
195					200					205									
Cys	Gly	Arg	Pro	Gln	Ala	Thr	Ala	Val	Tyr	Lys	Val	Ser	Glu	Tyr	Ala				
210				215				220											
Arg	Arg	Phe	Gly	Val	Pro	Val	Ile	Ala	Asp	Gly	Gly	Ile	Gln	Asn	Val				
225			230				235				240								
Gly	His	Ile	Ala	Lys	Ala	Leu	Ala	Leu	Gly	Ala	Ser	Thr	Val	Met	Met				
245					250					255									
Gly	Ser	Leu	Leu	Ala	Ala	Thr	Thr	Glu	Ala	Pro	Gly	Glu	Tyr	Phe	Phe				
260				265				270											
Ser	Asp	Gly	Ile	Arg	Leu	Lys	Lys	Tyr	Arg	Gly	Met	Gly	Ser	Leu	Asp				
275			280				285												
Ala	Met	Asp	Lys	His	Leu	Ser	Ser	Gln	Asn	Arg	Tyr	Phe	Ser	Glu	Ala				
290			295				300												
Asp	Lys	Ile	Lys	Val	Ala	Gln	Gly	Val	Ser	Gly	Ala	Val	Gln	Asp	Lys				
305		310				315				320									
Gly	Ser	Ile	His	Lys	Phe	Val	Pro	Tyr	Leu	Ile	Ala	Gly	Ile	Gln	His				
325				330				335											
Ser	Cys	Gln	Asp	Ile	Gly	Ala	Lys	Ser	Leu	Thr	Gln	Val	Arg	Ala	Met				
340				345				350											
Met	Tyr	Ser	Gly	Glu	Leu	Lys	Phe	Glu	Lys	Arg	Thr	Ser	Ser	Ala	Gln				
355			360				365												
Val	Glu	Gly	Gly	Val	His	Ser	Leu	His	Ser	Tyr	Glu	Lys	Arg	Leu	Phe				
370		375				380													

<210> 29  
<211> 384  
<212> PRT  
<213> Homo sapiens  
  
<400> 29

Met Ala Asp Tyr Leu Ile Ser Gly Gly Thr Ser Tyr Val Pro Asp Asp  
1 5 10 15

Gly Leu Thr Ala Gln Gln Leu Phe Asn Cys Gly Asp Gly Leu Thr Tyr  
20 25 30

Asn Asp Phe Leu Ile Leu Pro Gly Tyr Ile Asp Phe Thr Ala Asp Gln  
35 40 45

Val Asp Leu Thr Ser Ala Leu Thr Lys Lys Ile Thr Leu Lys Thr Pro  
50 55 60

Leu Val Ser Ser Pro Met Asp Thr Val Thr Glu Ala Gly Met Ala Ile  
65 70 75 80

Ala Met Ala Leu Thr Gly Gly Ile Gly Phe Ile His His Asn Cys Thr  
85 90 95

Pro Glu Phe Gln Ala Asn Glu Val Arg Lys Val Lys Lys Tyr Gly Ser  
100 105 110

Gly Leu Leu Cys Gly Ala Ala Ile Gly Thr His Glu Asp Asp Lys Tyr  
115 120 125

Arg Leu Asp Leu Leu Ala Gln Ala Gly Val Asp Val Val Val Leu Asp  
130 135 140

Ser Ser Gln Gly Asn Ser Ile Phe Gln Ile Asn Met Ile Lys Tyr Ile  
145 150 155 160

Lys Asp Lys Tyr Pro Asn Leu Gln Val Ile Gly Gly Asn Val Val Thr  
165 170 175

Ala Ala Gln Ala Lys Asn Leu Ile Asp Ala Gly Val Asp Ala Leu Arg  
180 185 190

Val Gly Met Gly Ser Gly Ser Ile Cys Ile Thr Gln Glu Val Leu Ala  
195 200 205

Cys Gly Arg Pro Gln Ala Thr Ala Val Tyr Lys Val Ser Glu Tyr Ala  
210 215 220

Arg Arg Phe Gly Val Pro Val Ile Ala Asp Gly Gly Ile Gln Asn Val  
225 230 235 240

Gly His Ile Ala Lys Ala Leu Ala Leu Gly Ala Ser Thr Val Met Met  
245 250 255

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Gly Ser Leu Leu Ala Ala Thr Thr Glu Ala Pro Gly Glu Tyr Phe Phe  
 260 265 270

Ser Asp Gly Ile Arg Leu Lys Lys Tyr Arg Gly Met Gly Ser Leu Asp  
 275 280 285

Ala Met Asp Lys His Leu Ser Ser Gln Asn Arg Tyr Phe Ser Glu Ala  
 290 295 300

Asp Lys Ile Lys Val Ala Gln Gly Val Ser Gly Ala Val Gln Asp Lys  
 305 310 315 320

Gly Ser Ile His Lys Phe Val Pro Tyr Leu Ile Ala Gly Ile Gln His  
 325 330 335

Ser Cys Gln Asp Ile Gly Ala Lys Ser Leu Thr Gln Val Arg Ala Met  
 340 345 350

Met Tyr Ser Gly Glu Leu Lys Phe Glu Lys Arg Thr Ser Ser Ala Gln  
 355 360 365

Val Glu Gly Gly Val His Ser Leu His Ser Tyr Glu Lys Arg Leu Phe  
 370 375 380

<210> 30  
 <211> 384  
 <212> PRT  
 <213> Homo sapiens

<400> 30

Met Ala Asp Tyr Leu Ile Ser Gly Gly Thr Gly Tyr Val Pro Glu Asp  
 1 5 10 15

Gly Leu Thr Ala Gln Gln Leu Phe Ala Ser Ala Asp Gly Leu Thr Tyr  
 20 25 30

Asn Asp Phe Leu Ile Leu Pro Gly Phe Ile Asp Phe Ile Ala Asp Glu  
 35 40 45

Val Asp Leu Thr Ser Ala Leu Thr Arg Lys Ile Thr Leu Lys Thr Pro  
 50 55 60

Leu Ile Ser Ser Pro Met Asp Thr Val Thr Glu Ala Asp Met Ala Ile  
 65 70 75 80

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Ala Met Ala Leu Met Gly Gly Ile Gly Phe Ile His His Asn Cys Thr  
85 90 95

Pro Glu Phe Gln Ala Asn Glu Val Arg Lys Val Lys Lys Phe Asp Lys  
100 105 110

Thr Leu Leu Cys Gly Ala Ala Val Gly Thr Arg Glu Asp Asp Lys Tyr  
115 120 125

Arg Leu Asp Leu Leu Thr Gln Ala Gly Val Asp Val Ile Val Leu Asp  
130 135 140

Ser Ser Gln Gly Asn Ser Val Tyr Gln Ile Ala Met Val His Tyr Ile  
145 150 155 160

Lys Gln Lys Tyr Pro His Leu Gln Val Ile Gly Gly Asn Val Val Thr  
165 170 175

Ala Ala Gln Ala Lys Asn Leu Ile Asp Ala Gly Val Asp Gly Leu Arg  
180 185 190

Val Gly Met Gly Cys Gly Ser Ile Cys Ile Thr Gln Glu Val Met Ala  
195 200 205

Cys Gly Arg Pro Gln Gly Thr Ala Val Tyr Lys Val Ala Glu Tyr Ala  
210 215 220

Arg Arg Phe Gly Val Pro Ile Ile Ala Asp Gly Gly Ile Gln Thr Val  
225 230 235 240

Gly His Val Val Lys Ala Leu Ala Leu Gly Ala Ser Thr Val Met Met  
245 250 255

Gly Ser Leu Leu Ala Ala Thr Thr Glu Ala Pro Gly Glu Tyr Phe Phe  
260 265 270

Ser Asp Gly Val Arg Leu Lys Lys Tyr Arg Gly Met Gly Ser Leu Asp  
275 280 285

Ala Met Glu Lys Ser Ser Ser Ser Gln Lys Arg Tyr Phe Ser Glu Gly  
290 295 300

Asp Lys Val Lys Ile Ala Gln Gly Val Ser Gly Ser Ile Gln Asp Lys  
305 310 315 320

Gly Ser Ile Gln Lys Phe Val Pro Tyr Leu Ile Ala Gly Ile Gln His  
325 330 335

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145                      150                      155                      160  
 Ile Lys Asp Lys Tyr Pro Asn Leu Gln Val Ile Gly Gly Asn Val Val  
                                  165                                   170                                   175  
 Thr Ala Ala Gln Ala Lys Asn Leu Ile Asp Ala Gly Val Asp Ala Leu  
                                  180                                   185                                   190  
 Arg Val Gly Met Gly Ser Gly Ser Ile Cys Ile Thr Gln Glu Val Leu  
                                  195                                   200                                   205  
 Ala Cys Gly Arg Pro Gln Ala Thr Ala Val Tyr Lys Val Ser Glu Tyr  
                                  210                                   215                                   220  
 Ala Arg Arg Phe Gly Val Pro Val Ile Ala Asp Gly Gly Ile Gln Asn  
 225                                   230                                   235                                   240  
 Val Gly His Ile Ala Lys Ala Leu Ala Leu Gly Ala Ser Thr Val Met  
                                  245                                   250                                   255  
 Met Gly Ser Leu Leu Ala Ala Thr Thr Glu Ala Pro Gly Glu Tyr Phe  
                                  260                                   265                                   270  
 Phe Ser Asp Gly Ile Arg Leu Lys Lys Tyr Arg Gly Met Gly Ser Leu  
                                  275                                   280                                   285  
 Asp Ala Met Asp Lys His Leu Ser Ser Gln Asn Arg Tyr Phe Ser Glu  
                                  290                                   295                                   300  
 Ala Asp Lys Ile Lys Val Ala Gln Gly Val Ser Gly Ala Val Gln Asp  
 305                                   310                                   315                                   320  
 Lys Gly Ser Ile His Lys Phe Val Pro Tyr Leu Ile Ala Gly Ile Gln  
                                  325                                   330                                   335  
 His Ser Cys Gln Asp Ile Gly Ala Lys Ser Leu Thr Gln Val Arg Ala  
                                  340                                   345                                   350  
 Met Met Tyr Ser Gly Glu Leu Lys Phe Glu Lys Arg Thr Ser Ser Ala  
                                  355                                   360                                   365  
 Gln Val Glu Gly Gly Val His Ser Leu His Ser Tyr Glu Lys Arg Leu  
                                  370                                   375                                   380  
 Phe  
 385

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Met Ala Asp Tyr Leu Ile Ser Gly Gly Thr Ser Tyr Val Pro Asp Asp  
1 5 10 15

Asn Asp Phe Leu Ile Leu Pro Gly Tyr Ile Asp Phe Thr Ala Asp Gln  
35 40 45

Leu Val Ser Ser Pro Met Asp Thr Val Thr Glu Ala Gly Met Ala Ile  
65 70 75 80

Pro Glu Phe Gln Ala Asn Glu Val Arg Lys Val Lys Lys Tyr Gln Pro  
100 105 110

Tyr Arg Leu Asp Leu Leu Ala Gln Ala Gly Val Asp Val Val Val Leu  
130 135 140

Ile Lys Asp Lys Tyr Pro Asn Leu Gln Val Ile Gly Gly Asn Val Val  
165 170 175

Arg Val Gly Met Gly Ser Gly Ser Ile Cys Ile Thr Gln Glu Val Leu  
195 200 205

26

Ala Arg Arg Phe Gly Val Pro Val Ile Ala Asp Gly Gly Ile Gln Asn  
225 230 235 240

Val Gly His Ile Ala Lys Ala Leu Ala Leu Gly Ala Ser Thr Val Met  
245 250 255

Met Gly Ser Leu Leu Ala Ala Thr Thr Glu Ala Pro Gly Glu Tyr Phe  
260 265 270

Phe Ser Asp Gly Ile Arg Leu Lys Lys Tyr Arg Gly Met Gly Ser Leu  
275 280 285

Asp Ala Met Asp Lys His Leu Ser Ser Gln Asn Arg Tyr Phe Ser Glu  
290 295 300

Ala Asp Lys Ile Lys Val Ala Gln Gly Val Ser Gly Ala Val Gln Asp  
305 310 315 320

Lys Gly Ser Ile His Lys Phe Val Pro Tyr Leu Ile Ala Gly Ile Gln  
325 330 335

His Ser Cys Gln Asp Ile Gly Ala Lys Ser Leu Thr Gln Val Arg Ala  
340 345 350

Met Met Tyr Ser Gly Glu Leu Lys Phe Glu Lys Arg Thr Ser Ser Ala  
355 360 365

Gln Val Glu Gly Gly Val His Ser Leu His Ser Tyr Glu Lys Arg Leu  
370 375 380

Phe  
385

<210> 33

<211> 385

<212> PRT

<213> Homo sapiens

<400> 33

Met Ala Asp Tyr Leu Ile Ser Gly Gly Thr Ser Tyr Val Pro Asp Asp  
1 5 10 15

Gly Leu Thr Ala Gln Gln Leu Phe Asn Cys Gly Asp Gly Leu Thr Tyr  
20 25 30

Asn Asp Phe Leu Ile Leu Pro Gly Tyr Ile Asp Phe Thr Ala Asp Gln  
35 40 45

Val Asp Leu Thr Ser Ala Leu Thr Lys Lys Ile Thr Leu Lys Thr Pro  
50 55 60

Leu Val Ser Ser Pro Met Asp Thr Val Thr Glu Ala Gly Met Ala Ile  
65 70 75 80

Ala Met Ala Leu Thr Gly Gly Ile Gly Phe Ile His His Asn Cys Thr  
85 90 95

Pro Glu Phe Gln Ala Asn Glu Val Arg Lys Val Lys Lys Tyr Asn Ile  
100 105 110

Ile Pro Leu Leu Cys Gly Ala Ala Ile Gly Thr His Glu Asp Asp Lys  
115 120 125

Tyr Arg Leu Asp Leu Leu Ala Gln Ala Gly Val Asp Val Val Val Leu  
130 135 140

Asp Ser Ser Gln Gly Asn Ser Ile Phe Gln Ile Asn Met Ile Lys Tyr  
145 150 155 160

Ile Lys Asp Lys Tyr Pro Asn Leu Gln Val Ile Gly Gly Asn Val Val  
165 170 175

Thr Ala Ala Gln Ala Lys Asn Leu Ile Asp Ala Gly Val Asp Ala Leu  
180 185 190

Arg Val Gly Met Gly Ser Gly Ser Ile Cys Ile Thr Gln Glu Val Leu  
195 200 205

Ala Cys Gly Arg Pro Gln Ala Thr Ala Val Tyr Lys Val Ser Glu Tyr  
210 215 220

Ala Arg Arg Phe Gly Val Pro Val Ile Ala Asp Gly Gly Ile Gln Asn  
225 230 235 240

Val Gly His Ile Ala Lys Ala Leu Ala Leu Gly Ala Ser Thr Val Met  
245 250 255

Met Gly Ser Leu Leu Ala Ala Thr Thr Glu Ala Pro Gly Glu Tyr Phe  
260 265 270

Phe Ser Asp Gly Ile Arg Leu Lys Lys Tyr Arg Gly Met Gly Ser Leu  
275 280 285

Asp Ala Met Asp Lys His Leu Ser Ser Gln Asn Arg Tyr Phe Ser Glu  
290 295 300

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Ala Asp Lys Ile Lys Val Ala Gln Gly Val Ser Gly Ala Val Gln Asp  
305 310 315 320

Lys Gly Ser Ile His Lys Phe Val Pro Tyr Leu Ile Ala Gly Ile Gln  
325 330 335

His Ser Cys Gln Asp Ile Gly Ala Lys Ser Leu Thr Gln Val Arg Ala  
340 345 350

Met Met Tyr Ser Gly Glu Leu Lys Phe Glu Lys Arg Thr Ser Ser Ala  
355 360 365

Gln Val Glu Gly Gly Val His Ser Leu His Ser Tyr Glu Lys Arg Leu  
370 375 380

Phe  
385

<210> 34

<211> 385

<212> PRT

<213> Homo sapiens

<400> 34

Met Ala Asp Tyr Leu Ile Ser Gly Gly Thr Ser Tyr Val Pro Asp Asp  
1 5 10 15

Gly Leu Thr Ala Gln Gln Leu Phe Asn Cys Gly Asp Gly Leu Thr Tyr  
20 25 30

Asn Asp Phe Leu Ile Leu Pro Gly Tyr Ile Asp Phe Thr Ala Asp Gln  
35 40 45

Val Asp Leu Thr Ser Ala Leu Thr Lys Lys Ile Thr Leu Lys Thr Pro  
50 55 60

Leu Val Ser Ser Pro Met Asp Thr Val Thr Glu Ala Gly Met Ala Ile  
65 70 75 80

Ala Met Ala Leu Thr Gly Gly Ile Gly Phe Ile His His Asn Cys Thr  
85 90 95

Pro Glu Phe Gln Ala Asn Glu Val Arg Lys Val Lys Lys Tyr Ser Pro  
100 105 110

Thr Gln Leu Leu Cys Gly Ala Ala Ile Gly Thr His Glu Asp Asp Lys

115						120					125				
Tyr	Arg	Leu	Asp	Leu	Leu	Ala	Gln	Ala	Gly	Val	Asp	Val	Val	Val	Leu
130						135					140				
Asp	Ser	Ser	Gln	Gly	Asn	Ser	Ile	Phe	Gln	Ile	Asn	Met	Ile	Lys	Tyr
145					150					155					160
Ile	Lys	Asp	Lys	Tyr	Pro	Asn	Leu	Gln	Val	Ile	Gly	Gly	Asn	Val	Val
				165					170					175	
Thr	Ala	Ala	Gln	Ala	Lys	Asn	Leu	Ile	Asp	Ala	Gly	Val	Asp	Ala	Leu
			180					185					190		
Arg	Val	Gly	Met	Gly	Ser	Gly	Ser	Ile	Cys	Ile	Thr	Gln	Glu	Val	Leu
		195					200					205			
Ala	Cys	Gly	Arg	Pro	Gln	Ala	Thr	Ala	Val	Tyr	Lys	Val	Ser	Glu	Tyr
210						215					220				
Ala	Arg	Arg	Phe	Gly	Val	Pro	Val	Ile	Ala	Asp	Gly	Gly	Ile	Gln	Asn
225					230					235					240
Val	Gly	His	Ile	Ala	Lys	Ala	Leu	Ala	Leu	Gly	Ala	Ser	Thr	Val	Met
				245					250					255	
Met	Gly	Ser	Leu	Leu	Ala	Ala	Thr	Thr	Glu	Ala	Pro	Gly	Glu	Tyr	Phe
			260					265					270		
Phe	Ser	Asp	Gly	Ile	Arg	Leu	Lys	Lys	Tyr	Arg	Gly	Met	Gly	Ser	Leu
		275					280					285			
Asp	Ala	Met	Asp	Lys	His	Leu	Ser	Ser	Gln	Asn	Arg	Tyr	Phe	Ser	Glu
290						295					300				
Ala	Asp	Lys	Ile	Lys	Val	Ala	Gln	Gly	Val	Ser	Gly	Ala	Val	Gln	Asp
305					310					315					320
Lys	Gly	Ser	Ile	His	Lys	Phe	Val	Pro	Tyr	Leu	Ile	Ala	Gly	Ile	Gln
				325					330					335	
His	Ser	Cys	Gln	Asp	Ile	Gly	Ala	Lys	Ser	Leu	Thr	Gln	Val	Arg	Ala
			340					345					350		
Met	Met	Tyr	Ser	Gly	Glu	Leu	Lys	Phe	Glu	Lys	Arg	Thr	Ser	Ser	Ala
		355					360					365			
Gln	Val	Glu	Gly	Gly	Val	His	Ser	Leu	His	Ser	Tyr	Glu	Lys	Arg	Leu

370

375

380

Phe

385

&lt;210&gt; 35

&lt;211&gt; 385

&lt;212&gt; PRT

&lt;213&gt; Homo sapiens

&lt;400&gt; 35

Met Ala Asp Tyr Leu Ile Ser Gly Gly Thr Ser Tyr Val Pro Asp Asp  
 1 5 10 15

Gly Leu Thr Ala Gln Gln Leu Phe Asn Cys Gly Asp Gly Leu Thr Tyr  
 20 25 30

Asn Asp Phe Leu Ile Leu Pro Gly Tyr Ile Asp Phe Thr Ala Asp Gln  
 35 40 45

Val Asp Leu Thr Ser Ala Leu Thr Lys Lys Ile Thr Leu Lys Thr Pro  
 50 55 60

Leu Val Ser Ser Pro Met Asp Thr Val Thr Glu Ala Gly Met Ala Ile  
 65 70 75 80

Ala Met Ala Leu Thr Gly Gly Ile Gly Phe Ile His His Asn Cys Thr  
 85 90 95

Pro Glu Phe Gln Ala Asn Glu Val Arg Lys Val Lys Lys Tyr Thr Arg  
 100 105 110

Tyr Thr Leu Leu Cys Gly Ala Ala Ile Gly Thr His Glu Asp Asp Lys  
 115 120 125

Tyr Arg Leu Asp Leu Leu Ala Gln Ala Gly Val Asp Val Val Val Leu  
 130 135 140

Asp Ser Ser Gln Gly Asn Ser Ile Phe Gln Ile Asn Met Ile Lys Tyr  
 145 150 155 160

Ile Lys Asp Lys Tyr Pro Asn Leu Gln Val Ile Gly Gly Asn Val Val  
 165 170 175

Thr Ala Ala Gln Ala Lys Asn Leu Ile Asp Ala Gly Val Asp Ala Leu  
 180 185 190

Arg Val Gly Met Gly Ser Gly Ser Ile Cys Ile Thr Gln Glu Val Leu  
195 200 205

Ala Cys Gly Arg Pro Gln Ala Thr Ala Val Tyr Lys Val Ser Glu Tyr  
210 215 220

Ala Arg Arg Phe Gly Val Pro Val Ile Ala Asp Gly Gly Ile Gln Asn  
225 230 235 240

Val Gly His Ile Ala Lys Ala Leu Ala Leu Gly Ala Ser Thr Val Met  
245 250 255

Met Gly Ser Leu Leu Ala Ala Thr Thr Glu Ala Pro Gly Glu Tyr Phe  
260 265 270

Phe Ser Asp Gly Ile Arg Leu Lys Lys Tyr Arg Gly Met Gly Ser Leu  
275 280 285

Asp Ala Met Asp Lys His Leu Ser Ser Gln Asn Arg Tyr Phe Ser Glu  
290 295 300

Ala Asp Lys Ile Lys Val Ala Gln Gly Val Ser Gly Ala Val Gln Asp  
305 310 315 320

Lys Gly Ser Ile His Lys Phe Val Pro Tyr Leu Ile Ala Gly Ile Gln  
325 330 335

His Ser Cys Gln Asp Ile Gly Ala Lys Ser Leu Thr Gln Val Arg Ala  
340 345 350

Met Met Tyr Ser Gly Glu Leu Lys Phe Glu Lys Arg Thr Ser Ser Ala  
355 360 365

Gln Val Glu Gly Gly Val His Ser Leu His Ser Tyr Glu Lys Arg Leu  
370 375 380

Phe  
385

<210> 36

<211> 385

<212> PRT

<213> Homo sapiens

<400> 36

Met Ala Asp Tyr Leu Ile Ser Gly Gly Thr Ser Tyr Val Pro Asp Asp  
1 5 10 15







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85

90

95

Pro Glu Phe Gln Ala Asn Glu Val Arg Lys Val Lys Lys Tyr Asn Gly  
100 105 110

Gln Tyr Leu Leu Cys Gly Ala Ala Ile Gly Thr His Glu Asp Asp Lys  
115 120 125

Tyr Arg Leu Asp Leu Leu Ala Gln Ala Gly Val Asp Val Val Val Leu  
130 135 140

Asp Ser Ser Gln Gly Asn Ser Ile Phe Gln Ile Asn Met Ile Lys Tyr  
145 150 155 160

Ile Lys Asp Lys Tyr Pro Asn Leu Gln Val Ile Gly Gly Asn Val Val  
165 170 175

Thr Ala Ala Gln Ala Lys Asn Leu Ile Asp Ala Gly Val Asp Ala Leu  
180 185 190

Arg Val Gly Met Gly Ser Gly Ser Ile Cys Ile Thr Gln Glu Val Leu  
195 200 205

Ala Cys Gly Arg Pro Gln Ala Thr Ala Val Tyr Lys Val Ser Glu Tyr  
210 215 220

Ala Arg Arg Phe Gly Val Pro Val Ile Ala Asp Gly Gly Ile Gln Asn  
225 230 235 240

Val Gly His Ile Ala Lys Ala Leu Ala Leu Gly Ala Ser Thr Val Met  
245 250 255

Met Gly Ser Leu Leu Ala Ala Thr Thr Glu Ala Pro Gly Glu Tyr Phe  
260 265 270

Phe Ser Asp Gly Ile Arg Leu Lys Lys Tyr Arg Gly Met Gly Ser Leu  
275 280 285

Asp Ala Met Asp Lys His Leu Ser Ser Gln Asn Arg Tyr Phe Ser Glu  
290 295 300

Ala Asp Lys Ile Lys Val Ala Gln Gly Val Ser Gly Ala Val Gln Asp  
305 310 315 320

Lys Gly Ser Ile His Lys Phe Val Pro Tyr Leu Ile Ala Gly Ile Gln  
325 330 335

His Ser Cys Gln Asp Ile Gly Ala Lys Ser Leu Thr Gln Val Arg Ala

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340 345 350

Met Met Tyr Ser Gly Glu Leu Lys Phe Glu Lys Arg Thr Ser Ser Ala  
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Gln Val Glu Gly Gly Val His Ser Leu His Ser Tyr Glu Lys Arg Leu  
370 375 380

Phe  
385

<210> 38  
<211> 385  
<212> PRT  
<213> Homo sapiens

<400> 38

Met Ala Asp Tyr Leu Ile Ser Gly Gly Thr Ser Tyr Val Pro Asp Asp  
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Gly Leu Thr Ala Gln Gln Leu Phe Asn Cys Gly Asp Gly Leu Thr Tyr  
20 25 30

Asn Asp Phe Leu Ile Leu Pro Gly Tyr Ile Asp Phe Thr Ala Asp Gln  
35 40 45

Val Asp Leu Thr Ser Ala Leu Thr Lys Lys Ile Thr Leu Lys Thr Pro  
50 55 60

Leu Val Ser Ser Pro Met Asp Thr Val Thr Glu Ala Gly Met Ala Ile  
65 70 75 80

Ala Met Ala Leu Thr Gly Gly Ile Gly Phe Ile His His Asn Cys Thr  
85 90 95

Pro Glu Phe Gln Ala Asn Glu Val Arg Lys Val Lys Lys Tyr Asn Ser  
100 105 110

Pro Leu Leu Leu Cys Gly Ala Ala Ile Gly Thr His Glu Asp Asp Lys  
115 120 125

Tyr Arg Leu Asp Leu Leu Ala Gln Ala Gly Val Asp Val Val Val Leu  
130 135 140

Asp Ser Ser Gln Gly Asn Ser Ile Phe Gln Ile Asn Met Ile Lys Tyr  
145 150 155 160

Ile Lys Asp Lys Tyr Pro Asn Leu Gln Val Ile Gly Gly Asn Val Val  
 165 170 175

Thr Ala Ala Gln Ala Lys Asn Leu Ile Asp Ala Gly Val Asp Ala Leu  
 180 185 190

Arg Val Gly Met Gly Ser Gly Ser Ile Cys Ile Thr Gln Glu Val Leu  
 195 200 205

Ala Cys Gly Arg Pro Gln Ala Thr Ala Val Tyr Lys Val Ser Glu Tyr  
 210 215 220

Ala Arg Arg Phe Gly Val Pro Val Ile Ala Asp Gly Gly Ile Gln Asn  
 225 230 235 240

Val Gly His Ile Ala Lys Ala Leu Ala Leu Gly Ala Ser Thr Val Met  
 245 250 255

Met Gly Ser Leu Leu Ala Ala Thr Thr Glu Ala Pro Gly Glu Tyr Phe  
 260 265 270

Phe Ser Asp Gly Ile Arg Leu Lys Lys Tyr Arg Gly Met Gly Ser Leu  
 275 280 285

Asp Ala Met Asp Lys His Leu Ser Ser Gln Asn Arg Tyr Phe Ser Glu  
 290 295 300

Ala Asp Lys Ile Lys Val Ala Gln Gly Val Ser Gly Ala Val Gln Asp  
 305 310 315 320

Lys Gly Ser Ile His Lys Phe Val Pro Tyr Leu Ile Ala Gly Ile Gln  
 325 330 335

His Ser Cys Gln Asp Ile Gly Ala Lys Ser Leu Thr Gln Val Arg Ala  
 340 345 350

Met Met Tyr Ser Gly Glu Leu Lys Phe Glu Lys Arg Thr Ser Ser Ala  
 355 360 365

Gln Val Glu Gly Gly Val His Ser Leu His Ser Tyr Glu Lys Arg Leu  
 370 375 380

Phe  
 385

<210> 39  
 <211> 385

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<212> PRT

<213> Homo sapiens

<400> 39

Met Ala Asp Tyr Leu Ile Ser Gly Gly Thr Ser Tyr Val Pro Asp Asp  
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Gly Leu Thr Ala Gln Gln Leu Phe Asn Cys Gly Asp Gly Leu Thr Tyr  
20 25 30

Asn Asp Phe Leu Ile Leu Pro Gly Tyr Ile Asp Phe Thr Ala Asp Gln  
35 40 45

Val Asp Leu Thr Ser Ala Leu Thr Lys Lys Ile Thr Leu Lys Thr Pro  
50 55 60

Leu Val Ser Ser Pro Met Asp Thr Val Thr Glu Ala Gly Met Ala Ile  
65 70 75 80

Ala Met Ala Leu Thr Gly Gly Ile Gly Phe Ile His His Asn Cys Thr  
85 90 95

Pro Glu Phe Gln Ala Asn Glu Val Arg Lys Val Lys Lys Tyr Tyr Gly  
100 105 110

Thr Trp Leu Leu Cys Gly Ala Ala Ile Gly Thr His Glu Asp Asp Lys  
115 120 125

Tyr Arg Leu Asp Leu Leu Ala Gln Ala Gly Val Asp Val Val Val Leu  
130 135 140

Asp Ser Ser Gln Gly Asn Ser Ile Phe Gln Ile Asn Met Ile Lys Tyr  
145 150 155 160

Ile Lys Asp Lys Tyr Pro Asn Leu Gln Val Ile Gly Gly Asn Val Val  
165 170 175

Thr Ala Ala Gln Ala Lys Asn Leu Ile Asp Ala Gly Val Asp Ala Leu  
180 185 190

Arg Val Gly Met Gly Ser Gly Ser Ile Cys Ile Thr Gln Glu Val Leu  
195 200 205

Ala Cys Gly Arg Pro Gln Ala Thr Ala Val Tyr Lys Val Ser Glu Tyr  
210 215 220

Ala Arg Arg Phe Gly Val Pro Val Ile Ala Asp Gly Gly Ile Gln Asn  
225 230 235 240

Val Gly His Ile Ala Lys Ala Leu Ala Leu Gly Ala Ser Thr Val Met  
 245 250 255

Met Gly Ser Leu Leu Ala Ala Thr Thr Glu Ala Pro Gly Glu Tyr Phe  
 260 265 270

Phe Ser Asp Gly Ile Arg Leu Lys Lys Tyr Arg Gly Met Gly Ser Leu  
 275 280 285

Asp Ala Met Asp Lys His Leu Ser Ser Gln Asn Arg Tyr Phe Ser Glu  
 290 295 300

Ala Asp Lys Ile Lys Val Ala Gln Gly Val Ser Gly Ala Val Gln Asp  
 305 310 315 320

Lys Gly Ser Ile His Lys Phe Val Pro Tyr Leu Ile Ala Gly Ile Gln  
 325 330 335

His Ser Cys Gln Asp Ile Gly Ala Lys Ser Leu Thr Gln Val Arg Ala  
 340 345 350

Met Met Tyr Ser Gly Glu Leu Lys Phe Glu Lys Arg Thr Ser Ser Ala  
 355 360 365

Gln Val Glu Gly Gly Val His Ser Leu His Ser Tyr Glu Lys Arg Leu  
 370 375 380

Phe  
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<210> 40

<211> 1155

<212> DNA

<213> Homo sapiens

<400> 40

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 gtgggttttg actcttccca gggaaattcc atcttcaga tcaatatgat caagtacatc 480  
 aaagacaaat accctaattc ccaagtcatt ggaggcaatg tggctactgc tgcccaggcc 540  
 aagaacctca ttgatgcagg tgtggatgcc ctgcgggtgg gcatgggaag tggctccatc 600

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gggtcatattg cgaaagcctt ggcccttggg gcctccacag tcatgatggg ctctctcctg 780  
gctgccacca ctgaggcccc tgggtgaatac ttcttttccg atgggatccg gctaaagaaa 840  
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<210> 41

<211> 1155

<212> DNA

<213> Homo sapiens

<400> 41

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ggcactcatg aggatgacaa gtataggctg gacttgctcg cccaggctgg tgtggatgta 420  
gtgggttttgg actcttccca gggaaattcc atcttccaga tcaatatgat caagtacatc 480  
aaagacaaat accctaattc ccaagtcatt ggaggcaatg tggtcactgc tgcccaggcc 540  
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<210> 42

<211> 1155

<212> DNA

<213> Homo sapiens

<400> 42

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tacatcgact tcaactgcaga ccaggtggac ctgacttctg ctctgaccaa gaaaatcact 180  
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<210> 43
<211> 1155
<212> DNA
<213> Homo sapiens

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<400> 43
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<210> 44
<211> 1155
<212> DNA
<213> Homo sapiens

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<400> 44

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<210> 45

<211> 1158

<212> DNA

<213> Homo sapiens

<400> 45

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gtagtggttt tggactcttc ccagggaaat tccatcttcc agatcaatat gatcaagtac 480
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gacattggtg ccaagagctt gacccaagtc cgagccatga tgtactctgg ggagcttaag 1080
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gagaagcggc ttttctga

1158

<210> 46

<211> 1158

<212> DNA

<213> Homo sapiens

<400> 46

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tacatcgact tcaactgcaga ccagggtggac ctgacttctg ctctgaccaa gaaaatcact 180  
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<210> 47

<211> 1158

<212> DNA

<213> Homo sapiens

<400> 47

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tacatcgact tcaactgcaga ccagggtggac ctgacttctg ctctgaccaa gaaaatcact 180  
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gtagtggttt tggactcttc ccagggaat tccatcttcc agatcaatat gatcaagtac 480  
atcaaagaca aataccctaa tctccaagtc attggaggca atgtggtcac tgctgccag 540  
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gtgtcagagt atgcacggcg ctttgggtgt cgggtcattg ctgatggagg aatccaaaat 720  
gtgggtcata ttgcgaaagc cttggccctt ggggcctcca cagtcatgat gggctctctc 780

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 aaagggtcaa tccacaaatt tgtcccttac ctgattgctg gcatccaaca ctcatgccag 1020  
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<400> 48

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Gly Leu Thr Ala Gln Gln Leu Phe Ala Ser Ala Asp Asp Leu Thr Tyr  
 20 25 30

Asn Asp Phe Leu Ile Leu Pro Gly Phe Ile Asp Phe Ile Ala Asp Glu  
 35 40 45

Val Asp Leu Thr Ser Ala Leu Thr Arg Lys Ile Thr Leu Lys Thr Pro  
 50 55 60

Leu Ile Ser Ser Pro Met Asp Thr Val Thr Glu Ala Asp Met Ala Ile  
 65 70 75 80

Ala Met Ala Leu Met Gly Gly Ile Gly Phe Ile His His Asn Cys Thr  
 85 90 95

Pro Glu Phe Gln Ala Asn Glu Val Arg Lys Val Lys Asn Phe Glu Gln  
 100 105 110

Gly Phe Ile Thr Asp Pro Val Val Leu Ser Pro Ser His Thr Val Gly  
 115 120 125

Asp Val Leu Glu Ala Lys Met Arg His Gly Phe Ser Gly Ile Pro Ile  
 130 135 140

Thr Glu Thr Gly Thr Met Gly Ser Lys Leu Val Gly Ile Val Thr Ser  
 145 150 155 160

Arg Asp Ile Asp Phe Leu Ala Glu Lys Asp His Thr Thr Leu Leu Ser  
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Glu Val Met Thr Pro Arg Ile Glu Leu Val Val Ala Pro Ala Gly Val

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FOOTNOTES: 8765550

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210					215					220						
Thr	Asp	Leu	Lys	Lys	Asn	Arg	Asp	Tyr	Pro	Leu	Ala	Ser	Lys	Asp	Ser	
225					230					235					240	
Gln	Lys	Gln	Leu	Leu	Cys	Gly	Ala	Ala	Val	Gly	Thr	Arg	Glu	Asp	Asp	
245					250					255						
Lys	Tyr	Arg	Leu	Asp	Leu	Leu	Thr	Gln	Ala	Gly	Val	Asp	Val	Ile	Val	
260					265					270						
Leu	Asp	Ser	Ser	Gln	Gly	Asn	Ser	Val	Tyr	Gln	Ile	Ala	Met	Val	His	
275					280					285						
Tyr	Ile	Lys	Gln	Lys	Tyr	Pro	His	Leu	Gln	Val	Ile	Gly	Gly	Asn	Val	
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Val	Thr	Ala	Ala	Gln	Ala	Lys	Asn	Leu	Ile	Asp	Ala	Gly	Val	Asp	Gly	
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Leu	Arg	Val	Gly	Met	Gly	Cys	Gly	Ser	Ile	Cys	Ile	Thr	Gln	Glu	Val	
325					330					335						
Met	Ala	Cys	Gly	Arg	Pro	Gln	Gly	Thr	Ala	Val	Tyr	Lys	Val	Ala	Glu	
340					345					350						
Tyr	Ala	Arg	Arg	Phe	Gly	Val	Pro	Ile	Ile	Ala	Asp	Gly	Gly	Ile	Gln	
355					360					365						
Thr	Val	Gly	His	Val	Val	Lys	Ala	Leu	Ala	Leu	Gly	Ala	Ser	Thr	Val	
370					375					380						
Met	Met	Gly	Ser	Leu	Leu	Ala	Ala	Thr	Thr	Glu	Ala	Pro	Gly	Glu	Tyr	
385					390					395					400	
Phe	Phe	Ser	Asp	Gly	Val	Arg	Leu	Lys	Lys	Tyr	Arg	Gly	Met	Gly	Ser	
405					410					415						
Leu	Asp	Ala	Met	Glu	Lys	Ser	Ser	Ser	Ser	Gln	Lys	Arg	Tyr	Phe	Ser	
420					425					430						
Glu	Gly	Asp	Lys	Val	Lys	Ile	Ala	Gln	Gly	Val	Ser	Gly	Ser	Ile	Gln	

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435 440 445  
Asp Lys Gly Ser Ile Gln Lys Phe Val Pro Tyr Leu Ile Ala Gly Ile  
450 455 460  
Gln His Gly Cys Gln Asp Ile Gly Ala Arg Ser Leu Ser Val Leu Arg  
465 470 475 480  
Ser Met Met Tyr Ser Gly Glu Leu Lys Phe Glu Lys Arg Thr Met Ser  
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Ala Gln Ile Glu Gly Gly Val His Gly Leu His Ser Tyr Glu Lys Arg  
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Leu Tyr

<210> 49

<211> 514

<212> PRT

<213> Homo sapiens

<400> 49

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Gly Leu Thr Ala Gln Gln Leu Phe Asn Cys Gly Asp Gly Leu Thr Tyr  
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Asn Asp Phe Leu Ile Leu Pro Gly Tyr Ile Asp Phe Thr Ala Asp Gln  
35 40 45

Val Asp Leu Thr Ser Ala Leu Thr Lys Lys Ile Thr Leu Lys Thr Pro  
50 55 60

Leu Val Ser Ser Pro Met Asp Thr Val Thr Glu Ala Gly Met Ala Ile  
65 70 75 80

Ala Met Ala Leu Thr Gly Gly Ile Gly Phe Ile His His Asn Cys Thr  
85 90 95

Pro Glu Phe Gln Ala Asn Glu Val Arg Lys Val Lys Lys Tyr Glu Gln  
100 105 110

Gly Phe Ile Thr Asp Pro Val Val Leu Ser Pro Lys Asp Arg Val Arg  
115 120 125



Met Met Gly Ser Leu Leu Ala Ala Thr Thr Glu Ala Pro Gly Glu Tyr  
385 390 395 400

Phe Phe Ser Asp Gly Ile Arg Leu Lys Lys Tyr Arg Gly Met Gly Ser  
405 410 415

Leu Asp Ala Met Asp Lys His Leu Ser Ser Gln Asn Arg Tyr Phe Ser  
420 425 430

Glu Ala Asp Lys Ile Lys Val Ala Gln Gly Val Ser Gly Ala Val Gln  
435 440 445

Asp Lys Gly Ser Ile His Lys Phe Val Pro Tyr Leu Ile Ala Gly Ile  
450 455 460

Gln His Ser Cys Gln Asp Ile Gly Ala Lys Ser Leu Thr Gln Val Arg  
465 470 475 480

Ala Met Met Tyr Ser Gly Glu Leu Lys Phe Glu Lys Arg Thr Ser Ser  
485 490 495

Ala Gln Val Glu Gly Gly Val His Ser Leu His Ser Tyr Glu Lys Arg  
500 505 510

Leu Phe

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<210> 52  
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Pro Ile Thr Glu Thr Gly Thr Met Gly Ser Lys Leu Val Gly Ile Val  
35 40 45  
Thr Ser Arg Asp Ile Asp Phe Leu Ala Glu Lys Asp His Thr Thr Leu  
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Leu Ser Glu Val Met Thr Pro Arg Ile Glu Leu Val Val Ala Pro Ala  
65 70 75 80  
Gly Val Thr Leu Lys Glu Ala Asn Glu Ile Leu Gln Arg Ser Lys Lys  
85 90 95  
Gly Lys Leu Pro Ile Val Asn Asp Cys Asp Glu Leu Val Ala Ile Ile  
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115

120

125

Asp Ser Gln Lys Gln  
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&lt;212&gt; PRT

&lt;213&gt; Homo sapiens

&lt;300&gt;

&lt;301&gt; Gu, Jing Jin

Spychala, Jozef

Mitchell, Beverly S.

<302> Regulation of the Human Inosine Monophosphate  
Dehydrogenase Type I Gene

&lt;303&gt; J. Biol. Chem.

&lt;304&gt; 272

&lt;305&gt; 7

&lt;306&gt; 4458-4466

&lt;307&gt; February 14, 1997

&lt;400&gt; 62

Met Ala Asp Tyr Leu Ile Ser Gly Gly Thr Gly Tyr Val Pro Glu Asp  
1 5 10 15

Gly Leu Thr Ala Gln Gln Leu Phe Ala Ser Ala Asp Gly Leu Thr Tyr  
20 25 30

Asn Asp Phe Leu Ile Leu Pro Gly Phe Ile Asp Phe Ile Ala Asp Glu  
35 40 45

Val Asp Leu Thr Ser Ala Leu Thr Arg Lys Ile Thr Leu Lys Thr Pro  
50 55 60

Leu Ile Ser Ser Pro Met Asp Thr Val Thr Glu Ala Asp Met Ala Ile  
65 70 75 80

Ala Met Ala Leu Met Gly Gly Ile Gly Phe Ile His His Asn Cys Thr  
85 90 95

Pro Glu Phe Gln Ala Asn Glu Val Arg Lys Val Lys Lys Phe Glu Gln  
100 105 110

Gly Phe Ile Thr Asp Pro Val Val Leu Ser Pro Ser His Thr Val Gly  
115 120 125

Asp Val Leu Glu Ala Lys Met Arg His Gly Phe Ser Gly Ile Pro Ile  
130 135 140

Thr Glu Thr Gly Thr Met Gly Ser Lys Leu Val Gly Ile Val Thr Ser  
145 150 155 160

Arg Asp Ile Asp Phe Leu Ala Glu Lys Asp His Thr Thr Leu Leu Ser  
165 170 175

Glu Val Met Thr Pro Arg Ile Glu Leu Val Val Ala Pro Ala Gly Val  
180 185 190

Thr Leu Lys Glu Ala Asn Glu Ile Leu Gln Arg Ser Lys Lys Gly Lys  
195 200 205

Leu Pro Ile Val Asn Asp Cys Asp Glu Leu Val Ala Ile Ile Ala Arg  
210 215 220

Thr Asp Leu Lys Lys Asn Arg Asp Tyr Pro Leu Ala Ser Lys Asp Ser  
225 230 235 240

Gln Lys Gln Leu Leu Cys Gly Ala Ala Val Gly Thr Arg Glu Asp Asp  
245 250 255

Lys Tyr Arg Leu Asp Leu Leu Thr Gln Ala Gly Val Asp Val Ile Val  
260 265 270

Leu Asp Ser Ser Gln Gly Asn Ser Val Tyr Gln Ile Ala Met Val His  
275 280 285

Tyr Ile Lys Gln Lys Tyr Pro His Leu Gln Val Ile Gly Gly Asn Val  
290 295 300

Val Thr Ala Ala Gln Ala Lys Asn Leu Ile Asp Ala Gly Val Asp Gly  
305 310 315 320

Leu Arg Val Gly Met Gly Cys Gly Ser Ile Cys Ile Thr Gln Glu Val  
325 330 335

Met Ala Cys Gly Arg Pro Gln Gly Thr Ala Val Tyr Lys Val Ala Glu  
340 345 350

Tyr Ala Arg Arg Phe Gly Val Pro Ile Ile Ala Asp Gly Gly Ile Gln  
355 360 365

Thr Val Gly His Val Val Lys Ala Leu Ala Leu Gly Ala Ser Thr Val  
370 375 380

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Met Met Gly Ser Leu Leu Ala Ala Thr Thr Glu Ala Pro Gly Glu Tyr  
 385 390 395 400

Phe Phe Ser Asp Gly Val Arg Leu Lys Lys Tyr Arg Gly Met Gly Ser  
 405 410 415

Leu Asp Ala Met Glu Lys Ser Ser Ser Ser Gln Lys Arg Tyr Phe Ser  
 420 425 430

Glu Gly Asp Lys Val Lys Ile Ala Gln Gly Val Ser Gly Ser Ile Gln  
 435 440 445

Asp Lys Gly Ser Ile Gln Lys Phe Val Pro Tyr Leu Ile Ala Gly Ile  
 450 455 460

Gln His Gly Cys Gln Asp Ile Gly Ala Arg Ser Leu Ser Val Leu Arg  
 465 470 475 480

Ser Met Met Tyr Ser Gly Glu Leu Lys Phe Glu Lys Arg Thr Met Ser  
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Ala Gln Ile Glu Gly Gly Val His Gly Leu His Ser Tyr Glu Lys Arg  
 500 505 510

Leu Tyr

<210> 63

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<213> Homo sapiens

<300>

<301> Collart, Frank R.

Huberman, Eliezer

<302> Cloning and Sequence Analysis of the Human and Chinese  
 Hamster Inosine-5'-monophosphate Dehydrogenase cDNAs

<303> J. Biol. Chem.

<304> 263

<305> 30

<306> 15769-15772

<307> October 25, 1988

<400> 63

Met Ala Asp Tyr Leu Ile Ser Gly Gly Thr Ser Tyr Val Pro Asp Asp  
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0953910-051001

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			20					25					30					
Asn	Asp	Phe	Leu	Ile	Leu	Pro	Gly	Tyr	Ile	Asp	Phe	Thr	Ala	Asp	Gln			
		35					40					45						
Val	Asp	Leu	Thr	Ser	Ala	Leu	Thr	Lys	Lys	Ile	Thr	Leu	Lys	Thr	Pro			
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Leu	Val	Ser	Ser	Pro	Met	Asp	Thr	Val	Thr	Glu	Ala	Gly	Met	Ala	Ile			
	65				70					75					80			
Ala	Met	Ala	Leu	Thr	Gly	Gly	Ile	Gly	Phe	Ile	His	His	Asn	Cys	Thr			
				85					90					95				
Pro	Glu	Phe	Gln	Ala	Asn	Glu	Val	Arg	Lys	Val	Lys	Lys	Tyr	Glu	Gln			
			100					105					110					
Gly	Phe	Ile	Thr	Asp	Pro	Val	Val	Leu	Ser	Pro	Lys	Asp	Arg	Val	Arg			
		115					120					125						
Asp	Val	Phe	Glu	Ala	Lys	Ala	Arg	His	Gly	Phe	Cys	Gly	Ile	Pro	Ile			
	130					135					140							
Thr	Asp	Thr	Gly	Arg	Met	Gly	Ser	Arg	Leu	Val	Gly	Ile	Ile	Ser	Ser			
	145				150					155					160			
Arg	Asp	Ile	Asp	Phe	Leu	Lys	Glu	Glu	Glu	His	Asp	Cys	Phe	Leu	Glu			
				165				170						175				
Glu	Ile	Met	Thr	Lys	Arg	Glu	Asp	Leu	Val	Val	Ala	Pro	Arg	Ser	Ile			
		180					185					190						
Thr	Leu	Lys	Glu	Ala	Asn	Glu	Ile	Leu	Gln	Arg	Ser	Lys	Lys	Gly	Lys			
		195					200					205						
Leu	Pro	Ile	Val	Asn	Glu	Asp	Asp	Glu	Leu	Val	Ala	Ile	Ile	Ala	Arg			
	210					215					220							
Thr	Asp	Leu	Lys	Lys	Asn	Arg	Asp	Tyr	Pro	Leu	Ala	Ser	Lys	Asp	Ala			
	225				230					235					240			
Lys	Lys	Gln	Leu	Leu	Cys	Gly	Ala	Ala	Ile	Gly	Thr	His	Glu	Asp	Asp			
			245					250					255					
Lys	Tyr	Arg	Leu	Asp	Leu	Leu	Ala	Gln	Ala	Gly	Val	Asp	Val	Val	Val			
		260					265					270						

Leu Asp Ser Ser Gln Gly Asn Ser Ile Phe Gln Ile Asn Met Ile Lys  
 275 280 285

Tyr Ile Lys Asp Lys Tyr Pro Asn Leu Gln Val Ile Gly Gly Asn Val  
 290 295 300

Val Thr Ala Ala Gln Ala Lys Asn Leu Ile Asp Ala Gly Val Asp Ala  
 305 310 315 320

Leu Arg Val Gly Met Gly Ser Gly Ser Ile Cys Ile Thr Gln Glu Val  
 325 330 335

Leu Ala Cys Gly Arg Pro Gln Ala Thr Ala Val Tyr Lys Val Ser Glu  
 340 345 350

Tyr Ala Arg Arg Phe Gly Val Pro Val Ile Ala Asp Gly Gly Ile Gln  
 355 360 365

Asn Val Gly His Ile Ala Lys Ala Leu Ala Leu Gly Ala Ser Thr Val  
 370 375 380

Met Met Gly Ser Leu Leu Ala Ala Thr Thr Glu Ala Pro Gly Glu Tyr  
 385 390 395 400

Phe Phe Ser Asp Gly Ile Arg Leu Lys Lys Tyr Arg Gly Met Gly Ser  
 405 410 415

Leu Asp Ala Met Asp Lys His Leu Ser Ser Gln Asn Arg Tyr Phe Ser  
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Glu Ala Asp Lys Ile Lys Val Ala Gln Gly Val Ser Gly Ala Val Gln  
 435 440 445

Asp Lys Gly Ser Ile His Lys Phe Val Pro Tyr Leu Ile Ala Gly Ile  
 450 455 460

Gln His Ser Cys Gln Asp Ile Gly Ala Lys Ser Leu Thr Gln Val Arg  
 465 470 475 480

Ala Met Met Tyr Ser Gly Glu Leu Lys Phe Glu Lys Arg Thr Ser Ser  
 485 490 495

Ala Gln Val Glu Gly Gly Val His Ser Leu His Ser Tyr Glu Lys Arg  
 500 505 510

Leu Phe

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Arg Asp Ile Asp Phe Leu Ala Glu Lys Asp His Thr Thr Leu Leu Ser  
165 170 175

Glu Val Met Thr Pro Arg Ile Glu Leu Val Val Ala Pro Ala Gly Val  
180 185 190

Thr Leu Lys Glu Ala Asn Glu Ile Leu Gln Arg Thr Lys Lys Gly Lys  
195 200 205

Leu Pro Ile Val Asn Asp Cys Asp Glu Leu Val Ala Ile Ile Ala Arg  
210 215 220

Thr Asp Leu Lys Lys Asn Arg Asp Tyr Pro Leu Ala Ser Lys Asp Ser  
225 230 235 240

Gln Lys Gln Leu Leu Cys Gly Ala Ala Val Gly Thr Arg Glu Asp Asp  
245 250 255

Lys Tyr Arg Leu Asp Leu Leu Thr Gln Ala Gly Val Asp Val Ile Val  
260 265 270

Phe His Ser Ser Gln Gly Asn Ser Val Tyr Gln Ile Ala Met Val His  
275 280 285

Tyr Ile Lys Gln Lys Tyr Pro His Leu Gln Val Ile Gly Gly Asn Val  
290 295 300

Val Thr Ala Ala Gln Ala Lys Asn Leu Ile Asp Ala Gly Val Asp Gly  
305 310 315 320

Leu Arg Val Gly Met Gly Cys Gly Ser Ile Cys Ile Thr Gln Glu Val  
325 330 335

Met Ala Cys Gly Arg Pro Gln Gly Thr Ala Val Tyr Lys Val Ala Glu  
340 345 350

Tyr Ala Arg Arg Phe Gly Val Pro Ile Ile Ala Asp Gly Gly Ile Gln  
355 360 365

Thr Val Gly His Val Val Lys Ala Leu Ala Leu Gly Ala Ser Thr Val  
370 375 380

Met Met Gly Ser Leu Leu Ala Ala Thr Thr Glu Ala Pro Gly Glu Tyr  
385 390 395 400

Phe Phe Ser Asp Gly Val Arg Leu Lys Lys Tyr Arg Gly Met Gly Ser  
405 410 415



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Leu	Ile	Ser	Ser	Pro	Met	Asp	Thr	Val	Thr	Glu	Ala	Asp	Met	Ala	Ile		
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Ala	Met	Ala	Leu	Met	Gly	Gly	Ile	Gly	Phe	Ile	His	His	Asn	Cys	Thr		
				85					90					95			
Pro	Glu	Phe	Gln	Ala	Asn	Glu	Val	Arg	Lys	Val	Lys	Asn	Phe	Glu	Gln		
			100					105					110				
Gly	Phe	Ile	Thr	Asp	Pro	Val	Val	Leu	Ser	Pro	Ser	His	Thr	Val	Gly		
		115					120					125					
Asp	Val	Leu	Glu	Ala	Lys	Met	Arg	His	Gly	Phe	Ser	Gly	Ile	Pro	Ile		
	130					135					140						
Thr	Glu	Thr	Gly	Thr	Met	Gly	Ser	Lys	Leu	Val	Gly	Ile	Val	Thr	Ser		
145					150					155					160		
Arg	Asp	Ile	Asp	Phe	Leu	Ala	Glu	Lys	Asp	His	Thr	Thr	Leu	Leu	Ser		
				165					170					175			
Glu	Val	Met	Thr	Pro	Arg	Ile	Glu	Leu	Val	Val	Ala	Pro	Ala	Gly	Val		
			180					185					190				
Thr	Leu	Lys	Glu	Ala	Asn	Glu	Ile	Leu	Gln	Arg	Ser	Lys	Lys	Gly	Lys		
	195						200					205					
Leu	Pro	Ile	Val	Asn	Asp	Cys	Asp	Glu	Leu	Val	Ala	Ile	Ile	Ala	Arg		
	210					215					220						
Thr	Asp	Leu	Lys	Lys	Asn	Arg	Asp	Tyr	Pro	Leu	Ala	Ser	Lys	Asp	Ser		
225					230					235					240		
Gln	Lys	Gln	Leu	Leu	Cys	Gly	Ala	Ala	Val	Gly	Thr	Arg	Glu	Asp	Asp		
			245						250					255			
Lys	Tyr	Arg	Leu	Asp	Leu	Leu	Thr	Gln	Ala	Gly	Val	Asp	Val	Ile	Val		
			260					265					270				
Phe	His	Ser	Ser	Gln	Gly	Asn	Ser	Val	Tyr	Gln	Ile	Ala	Met	Val	His		
		275					280					285					
Tyr	Ile	Lys	Gln	Lys	Tyr	Pro	His	Leu	Gln	Val	Ile	Gly	Gly	Asn	Val		
	290					295					300						
Val	Thr	Ala	Ala	Gln	Ala	Lys	Asn	Leu	Ile	Asp	Ala	Gly	Val	Asp	Gly		

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Met Ala Cys Gly Arg Pro Gln Gly Thr Ala Val Tyr Lys Val Ala Glu						
	340			345		350
Tyr Ala Arg Arg Phe Gly Val Pro Ile Ile Ala Asp Gly Gly Ile Gln						
	355			360		365
Thr Val Gly His Val Val Lys Ala Leu Ala Leu Gly Ala Ser Thr Val						
	370			375		380
Met Met Gly Ser Leu Leu Ala Ala Thr Thr Glu Ala Pro Gly Glu Tyr						
	385			390		395
						400
Phe Phe Ser Asp Gly Val Arg Leu Lys Lys Tyr Arg Gly Met Gly Ser						
	405			410		415
Leu Asp Pro Met Glu Lys Ser Ser Ser Ser Gln Lys Arg Tyr Phe Ser						
	420			425		430
Glu Gly Asp Lys Val Lys Ile Ala Gln Gly Val Ser Gly Ser Ile Gln						
	435			440		445
Asp Lys Gly Ser Ile Gln Lys Phe Val Pro Tyr Leu Ile Ala Gly Ile						
	450			455		460
Gln His Gly Cys Gln Asp Ile Gly Ala Arg Ser Leu Ser Val Leu Arg						
	465			470		475
						480
Ser Met Met Tyr Ser Gly Glu Leu Lys Phe Glu Lys Arg Thr Met Ser						
	485			490		495
Pro Gln Ile Glu Gly Gly Val His Gly Leu His Ser Tyr Glu Lys Arg						
	500			505		510
Leu Tyr						